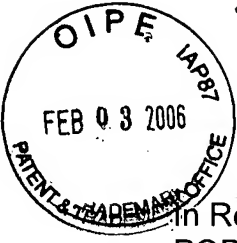


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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In Re Application of:
PODREBARAC ET AL

Serial No.: 10/820,399

Filed: 04/07/2004

§ Atty File: CDT 1788 CON

§

§

§ Group Art Unit: 1764

§

§ Examiner: W. D. GRIFFIN

For: PROCESS FOR THE SELECTIVE DESULFURIZATION OF
A MID RANGE GASOLINE CUT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF

1. Transmitted herewith is the APPEAL BRIEF in this application with respect to the Notice of Appeal.

2. STATUS OF APPLICANT

This application is on behalf of
☒ other than a small entity
☐ small entity

3. ☐ Applicant hereby petitions for an extension of time of (1) month for filing the Brief from the Notice of Appeal filed _____ as provided in 37 CFR 1.136 (a).
☐ a fee in the amount of \$ 120.00
☐ is enclosed
☐ charge to Deposit Account No. 10-0740. (Duplicate notice enclosed.)
☐ fee previously paid

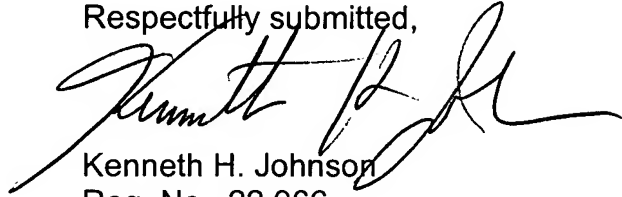
4. FEE FOR FILING APPEAL BRIEF

Pursuant to 37 CFR 1.17(f) the fee for filing the Appeal Brief is:
☐ small entity \$250.00
☒ other than a small entity \$500.00

5. FEE PAYMENT

- ☒ Attached is a check in the sum of \$500.00
☐ If any additional fee is required, charge Acct. No. 10-0740.
This sheet is presented in duplicate.
☐ fee previously paid.

Respectfully submitted,



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Date: 01/31/2006

CERTIFICATE OF MAILING

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Kenneth H. Johnson



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For: PROCESS FOR THE SELECTIVE DESULFURIZATION OF
A MID RANGE GASOLINE CUT

BRIEF ON APPEAL

Commissioner for Patents
P.O. Box 1450
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I.
REAL PARTY IN INTEREST

The subject patent application is assigned of record to Catalytic Distillation

Technologies. Therefore, the real party in interest is Catalytic Distillation Technologies.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences known to appellants or appellants' legal representative which will directly or indirectly affect or be affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

Claim 13 remains in the application. Claim 13 is on appeal. No claims are allowed.

IV. STATUS OF AMENDMENTS

All amendments have been entered.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The claimed subject matter of the claim on appeal is process for removal of sulfur from a full boiling range fluid cracked naphtha stream to meet higher standards for sulfur removal, by splitting the light portion of the stream utilizing a three-way naphtha splitter as a distillation column reactor to treat the lightest boiling range naphtha to remove the mercaptans contained therein by thioetherification and treating the components of the naphtha feed with the process that preserves the olefinic while most expediently removing the sulfur compounds. Mercaptans reacted with diolefins in the naphtha to form sulfides and are removed in that form. (Spec. page 4, lines 17-26). The light naphtha is boiled up into the catalyst in the rectification section where the mercaptans react with diolefins in the naphtha to form sulfides which are higher boiling and thus are separated out with the heavy naphtha. (Spec. page 10, lines 18-21). The heavy naphtha fraction is taken as bottoms.

(Spec. page 10, line 30). The mid-cut sidedraw of a thiophene cut is taken from the first distillation column reactor which is passed directly to a polishing reactor which is a single pass downflow reactor. (Spec. page 4, line 26-page 5, line 2).

VI.

GROUND OF REJECTION TO BE REVIEWED ON APPEAL

THE REJECTION OF CLAIM 13 AS BEING OBVIOUS UNDER 35 USC 103 (a) OVER HEARN ET AL U.S. 5,597,476 IN VIEW OF MCDANIEL U.S. 2003/0136706.

A copy of the references cited by the examiner and relied on in the final rejection are attached in (IX) EVIDENCE APPENDIX: U.S. 5,597,476 (Hearn et al) and U.S. 2003/0136706 (McDaniel et al).

McDaniel is prior art to the present application, which has an effective filing date of March 8, 2002, **only** because of the filing date of the provisional. Since the provisional is not publically available, applicants request that the examiner certify to the board and the applicants that there is literal support in the provisional for that which the examiner relies in the rejection.

VII.

ARGUMENT

GROUND: THE REJECTION OF CLAIM 13 AS BEING OBVIOUS UNDER 35 USC 103 (a) OVER HEARN ET AL U.S. 5,597,476 IN VIEW OF MCDANIEL U.S. 2003/0136706.

There is only one claim.

Hearn feeds naphtha to a first distillation column reactor which acts as a depentanizer or dehexanizer with the lighter material containing most of the olefins and mercaptans being boiled up into a first distillation reaction zone where the mercaptans are reacted with diolefins to form sulfides which are removed in the bottoms along with any

higher boiling sulfur compounds. The bottoms, which contain the sulfides, thiophenes and heavier mercaptan (see col. 2, lines 46-56; col. 3, lines 51-53; col. 4, lines 4-5, lines 41-43; col. 6, lines 62-64; col. 7, lines 6-20 and claims), are subjected to hydrodesulfurization in a second distillation column reactor where the sulfur compounds are converted to H₂S and removed. The lighter fraction containing most of the olefins is not subjected to the more harsh hydrogenation conditions of the second reactor. The point of Hearn is the removal of sulfur compounds, without reducing the olefin content of the feed.

Thus, in Hearn the stream containing the thiophenes are in the bottom stream, there is no suggestion in that reference that they be anywhere else.

In the present invention it was been found that the light FCC naphtha cut just below the light fraction also contains mercaptans and a significant amount of thiophenes. The mercaptans in this cut may be removed by the thioetherification, **but the thiophenes remain** and this cut will not meet sulfur requirements. (Spec. page 4, lines 7-10). The thioetherification carried out in the present process converts mercaptans to sulfides by the reaction with diolefins. The sulfides are heavy and are removed in the bottoms. The thiophenes in the present process do not react to form the heavy sulfides.

Under § 103, the scope and content of the prior art are to be determined; the differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject is determined. See *Graham v. John Deere*, 148 USPQ 459 (S. Ct. 1966).

The examiner notes that Hearn does not separate the naphtha into three fractions

nor the further hydrodesulfurization of an intermediate fraction.

While it is true that McDaniel carries out a reaction of a hydrocarbon stream containing thiophenes then splits the product into at least three streams for further handling, it also true that the thiophenic compounds undergo conversion to the refractory sulfur compounds (para. 49) which are in the third fraction (paragraph 0051, line 5-9) which also contains the thiophenic compounds and which is subjected to the vigorous hydrodesulfurization (paragraph 0051 lines 10-end). Thus, McDaniel is treating essentially the same fraction as Hearn, i.e., the bottoms, with no suggestion in the references to do anything else. However, the reactions in Hearn is not the same as McDaniel since the thiophenic compounds react (are converted) in the McDaniel process. It is respectfully submitted that the combination of references, fails to make out a *prima facie* case of obviousness. Furthermore, there would appear to be no thiophenes in McDaniel's intermediate stream, hence the proposed rationale that it would be obvious to separate the Hearn product into 3 streams and to treat the intermediate stream, as McDaniel (the third or heavy stream) is rebutted by the facts that the intermediate stream of Hearn can be expected to contain thiophene, while the intermediate stream of McDaniel does not.

There would be no incentive to split Hearn's product into 3 streams based on McDaniel since as is taught by McDaniel, the refractory adducts and thiophenic compounds are being treated **in the bottom fraction**. It is not shown or remotely suggested by either reference that a thiophene cut should be separately removed and treated. The thiophenes would not require the strong hydrogenation of the refractory bottoms of either Hearn or McDaniel. Thus, the olefin content and the hence the octane

rating of the overall streams will be greater by having the thiophene treated separately from the other bottoms.

Claim 13 is very clear that the thiophenes are in the intermediate fraction not the bottoms, which is removed and treated:

“(d) removing an intermediate naphtha as a side draw from said distillation column reactor containing thiophene, diolefins boiling in the range of thiophene and mercaptans boiling in the range of thiophene...

(f) feeding said intermediate naphtha to a single pass fixed bed reactor containing a hydrodesulfurization catalyst where substantially all of any remaining sulfides and other organic sulfur compounds are reacting with hydrogen to form hydrogen sulfide.”

The examiner has urged that McDaniel's examples show the intermediate fraction contains thiophenes, but TABLE V is deceptive. In fact the examples are not consistent with the McDaniel disclosure. In paragraph 0138, McDaniel is at great pain to point out that the fractionation was less than ideal and if the fractionation had been carried ideally the sulfur level (which would include the thiophenes) would have been significantly lower in the overheads and the intermediate fraction (100-200°C). McDaniel points out the results of the test would have been significant if the fractionation had been more ideal. In other words the example is not in line with McDaniel's invention. In the invention the sulfur would have been in the bottoms, not in either the overheads or the intermediate fraction and the disclosures would not have provided any incentive for treating the intermediate fraction. It would be inappropriate to rely on that which the inventor of the reference teaches to be not the desired or expected result to achieve the objectives of the invention.

It is well settled that a rejection based on § 103 must rest upon a factual basis rather than conjecture or speculation. "Where the legal conclusion of [of obviousness] is not supported by the facts it cannot stand." *In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967); see also *In re Sporck*, 301 F.2d 686, 690, 133 USPQ 360,364 (CCPA 1962). "Obviousness cannot be established by combining teachings of the prior art to produce the claimed invention, *absent* some teaching suggestion or incentive supporting the combination." *In re Geiger*, 2 USPQ2d 1276 (CAFC 1987). Hence, without the requisite teaching, suggestions or incentives there is no *prima facie* case and the rejection must fail. See also *In re Fine*, 5 USPQ2d 1596 and *Ex parte Levengood*, 28 USPQ2d 1300 (BdPatApp 1993). It is submitted that the total failure of either reference to express any interest in the thiophene cut, but rather to treat the thiophenes as just another component of the heavy fraction (and as detailed above McDaniel states the sulfur compounds **are** in the bottoms if the lab work had been carried out properly) fails to provide any incentive to rearrange and modify the two reference processes to arrive at the present claimed invention.

It is well settled that a rejection based on § 103 must rest upon a factual basis rather than conjecture or speculation. "Where the legal conclusion of [of obviousness] is not supported by the facts it cannot stand." *In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967); see also *In re Sporck*, 301 F.2d 686, 690, 133 USPQ 360,364 (CCPA 1962). "Obviousness cannot be established by combining teachings of the prior art to produce the claimed invention, *absent* some teaching suggestion or incentive supporting the combination." *In re Geiger*, 2 USPQ2d 1276 (CAFC 1987). Hence, without

the requisite teaching, suggestions or incentives there is no *prima facie* case and the rejection must fail. The court was addressing piecemeal combination of teachings, which could be argued met the claims, however, there is no proposed combination, and thus does not even meet the claims of the present invention and does not even rise to the level of putative *prima facie* case. See also *In re Fine*, 5 USPQ2d 1596 and *Ex parte Levengood*, 28 USPQ2d 1300 (BdPatApp 1993).

The final determination is whether the combined disclosures put the invention in the possession of the public. See *Beckman Instruments, Inc. v. LKB Produkter AB*, 13 USPQ2d 1301 (Fed Cir. 1989) where the court held that "in order to render a claimed apparatus or method obvious, the prior art must enable one skilled in the art to make and use the apparatus or method."

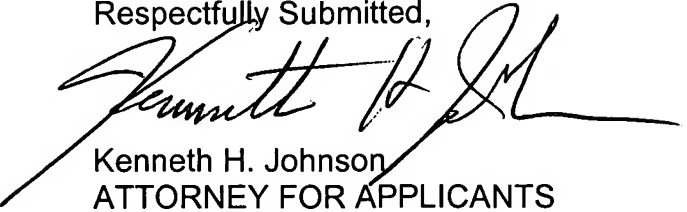
The examiner has speculated that the apparent bulk density of the supports of either Frenzel et al or Brown et al must be within the claimed range because the disclosed materials are similar. Silence in a reference is not a proper substitute for an adequate disclosure of facts. See *In re Burt*, 148 USPQ 548 (CCPA 1966). Furthermore, mere speculation by the examiner is not a substitute of evidence. *In re Warner, supra*.

Conclusion

It is submitted that the combinations of art as proposed by the examiner is based on the applicants' motivation to make the claimed invention rather than any suggestion in the references.

Applicants respectfully request that the board reverse the examiner.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read "Kenneth H. Johnson", written over the typed name and title.

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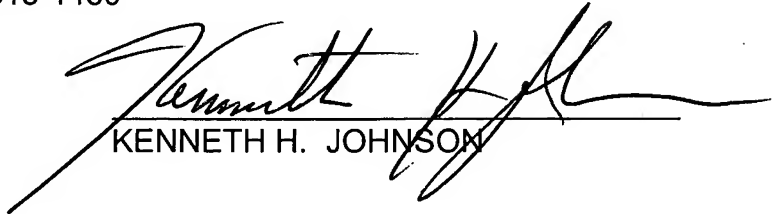
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KENNETH H. JOHNSON

VIII.

CLAIMS APPENDIX

13. A process for removal of sulfur from a full boiling range fluid cracked naphtha stream comprising the steps of:

(a) feeding hydrogen and a full boiling range naphtha feed containing olefins, diolefins, mercaptans, thiophene and other organic sulfur compounds to a distillation column reactor;

(b) concurrently in said distillation column reactor:

(i) reacting a portion of the mercaptans contained within said full boiling range naphtha stream with a portion of the diolefins contained within said full boiling range naphtha stream to produce sulfides and

(ii) separating said full boiling range naphtha stream into three fractions by fractional distillation;

(c) removing product from said distillation column reactor comprising a light naphtha containing substantially no mercaptans, sulfides or other organic sulfur compounds as an overheads;

(d) removing an intermediate naphtha as a side draw from said distillation column reactor containing thiophene, diolefins boiling in the range of thiophene and mercaptans boiling in the range of thiophene;

(e) removing a heavy naphtha from said distillation column reactor containing said sulfides and other organic sulfur compounds as a bottoms;

(f) feeding said intermediate naphtha to a single pass fixed bed reactor containing a hydrodesulfurization catalyst where substantially all of any remaining sulfides and other

organic sulfur compounds are reacting with hydrogen to form hydrogen sulfide.



IX.

EVIDENCE APPENDIX

A copy of each references cited by the examiner and relied on in the rejection:

U.S. 5,597,476 (Hearn et al)

U.S. 2003/0136706 (McDaniel et al)

X.

RELATED PROCEEDINGS APPENDIX

NONE